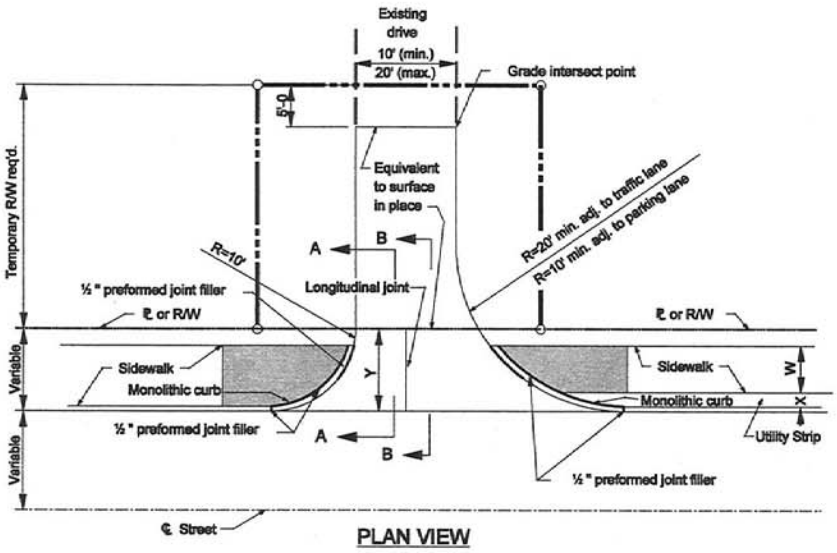
Item No. 1-3
Mr. Cales
Date: 1/20/05

REVISION TO STANDARD DRAWINGS

610-DRIV-01, Class I Drive
610-DRIV-02, Class II Drive
610-DRIV-03, Class III Drive
610-DRIV-04, Class IV Drive
610-DRIV-05, Class V Drive, Field Entrance
610-DRIV-06, Class VI Drive, Plan & Sections
610-DRIV-07, Class VII Drive and Joint Placement Detail
610-DRIV-08, Class I and III Drive Grade Profiles
610-DRIV-09, Class II and Class IV Sections
610-DRIV-10, Class II, IV, and V Drives, Approach Grades
610-DRIV-11, Class VI Drive, Typical Profile Grades
610-DRIV-12, Class VII Drive, Joint Placement and Corners
610-DRIV-13, Drives, General Notes and Legend

The above sheets have been rearranged since the last approval and the drive profile grades have been revised

Other sections containing specific cross references: NONE	General Instructions to Field Employees Update Required? Y___ N___ By - Additional or Revision Frequency Manual Update Required? Y____ N____ By – Addition or Revision
Recurring Special Provisions potentially affected: NONE	Standard Sheets potentially affected: SEE ABOVE
Motion: Mr. Second: Mr. Ayes: Nays:	Action: Passed as submitted; revised Effective - _____ Letting _____ Supplementals Withdrawn. Resubmit? _____ Received FHWA Approval? ____



PLAN VIEW

NOTES:

1. See Standard Drawing E 610-DRIV-13 for General Notes.
2. See Standard Drawings E 604-SDWK-01 or E 604-SDWK-02 for sidewalk elevation transition details.
3. See Standard Drawings E 610-DRIV-03 for concrete curb and gutter connection detail.
4. See Standard Drawings E 610-DRIV-07 for PCCP joint placement detail.
5. Class I drive pavement shall be 6 in. PCCP over 6 in. of compacted aggregate base..
6. See Standard Drawings E 610-DRIV-08 for section A-A and B-B.

LEGEND

W = Width of sidewalk
X = Distance between back face of curb and sidewalk.
Y = Distance from front face of curb to ℄ or R/W
Sidewalk elevation transition.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS I DRIVE

SEPTEMBER 2005

STANDARD DRAWING NO. E 610-DRIV-01

RICHARD L. VERCLER REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER
DESIGN STANDARDS ENGINEER

DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

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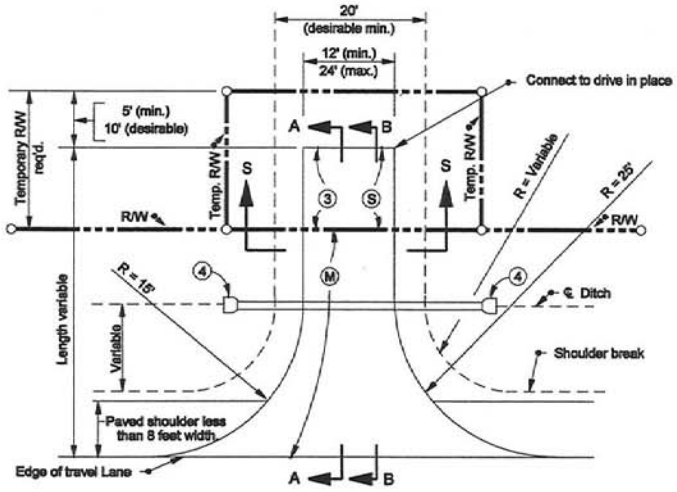
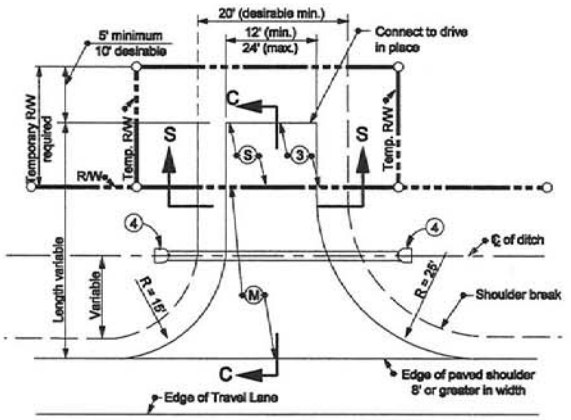


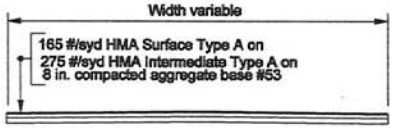
PLAN VIEW
(PAVED SHOULDER LESS THAN 8 FEET IN WIDTH OR UNPAVED SHOULDER)



PLAN VIEW
(PAVED SHOULDER 8 FEET OR GREATER IN WIDTH)

NOTES :

1. See Standard Drawing E 610-DRIV-13 for General Notes and Legend.
2. See Standard Drawing E 610-DRIV-10 for Sections A-A, B-B and C-C.
3. See Standard Drawing E 610-DRIV-10 for approach grades.
4. See Standard Drawing E 610-DRIV-09 for Section S-S.



HMA FOR APPROACHES
TYPICAL SECTION

LEGEND

Ⓜ Limits of HMA for approaches on comp. agg. base.

Ⓢ Equivalent to surface in place

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS II DRIVE

SEPTEMBER 2005

STANDARD DRAWING NO. E 610-DRIV-02

RICHARD L. VOELKER REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

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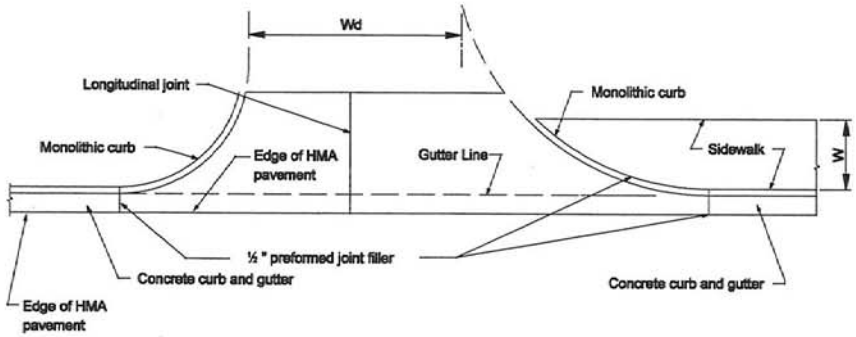
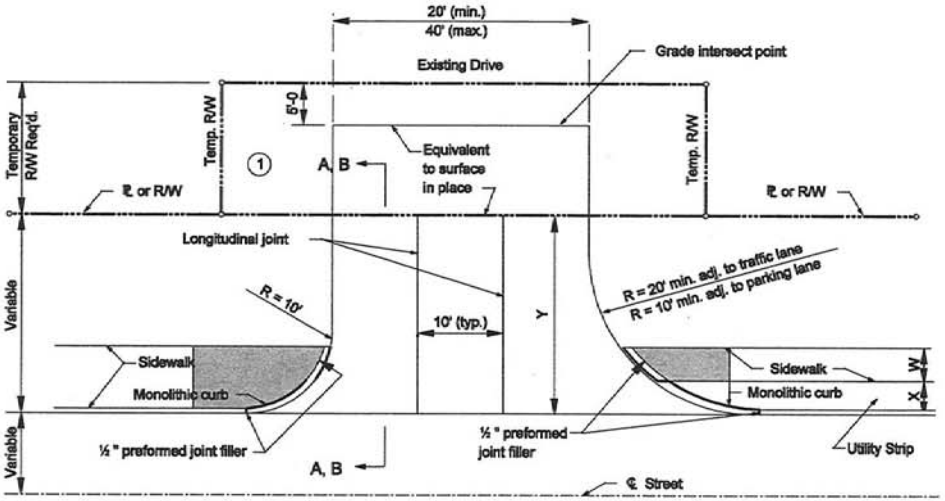


CONCRETE CURB & GUTTER CONNECTION FOR CLASS I & III DRIVES



PLAN VIEW - CLASS III DRIVE

NOTES :

① See Standard Drawing E 610-DRIV-08 for Section A-A, and Section B-B.

2. For Class III drive, PCCP pavement for driveways shall be placed over 6 in. of compacted aggregate base.

3. See Standard Drawings E 604-SDWK-01 or E 604-SDWK-02 for side walk elevation transition details, or Standard Drawing E 604-SWCR-09 for sidewalk curb ramp details if the drive is signalized.

LEGEND

W = Width of sidewalk

Wd = Driveway width

X = Distance between back face of curb and sidewalk

Y = Distance from front face of curb to ℄ or R/W

Sidewalk elevation transition.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS III DRIVE

SEPTEMBER 2005

STANDARD DRAWING NO. E 610-DRIV-03

RICHARD L. VONCLEVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

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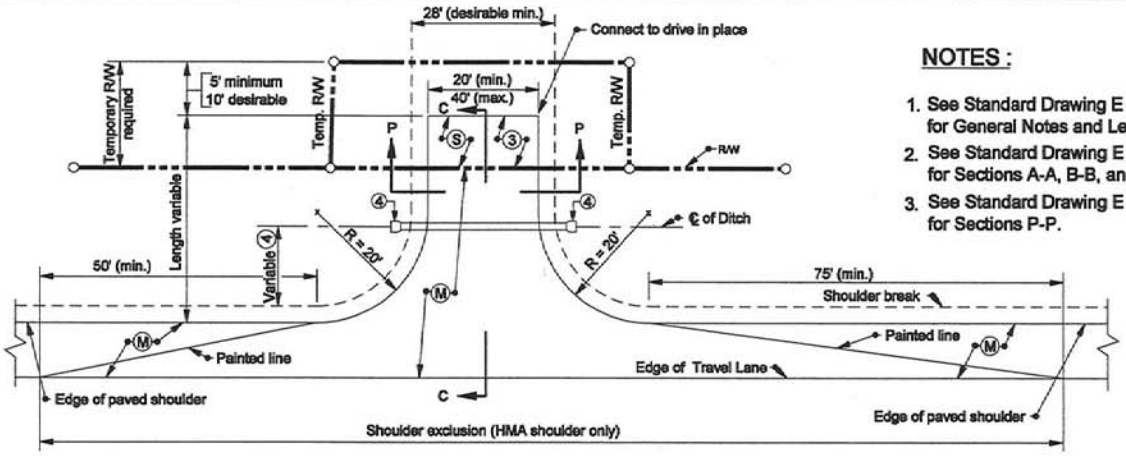
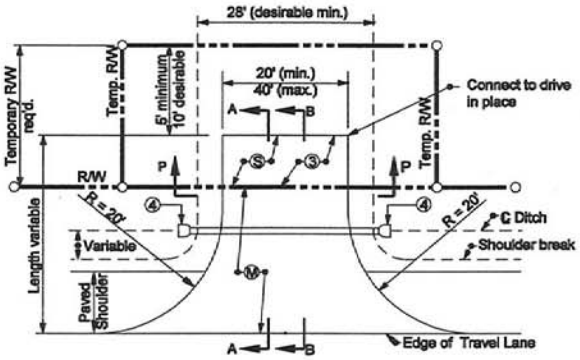


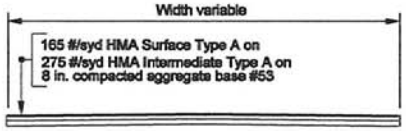
PLAN VIEW

(PAVED SHOULDER 8 FEET OR GREATER IN WIDTH)



PLAN VIEW

(PAVED SHOULDER LESS THAN 8 FEET IN WIDTH OR UNPAVED SHOULDER)



HMA FOR APPROACHES

TYPICAL SECTION

NOTES :

1. See Standard Drawing E 610-DRIV-13 for General Notes and Legend.
2. See Standard Drawing E 610-DRIV-10 for Sections A-A, B-B, and C-C.
3. See Standard Drawing E 610-DRIV-09 for Sections P-P.

LEGEND

Ⓜ Limits of HMA for approaches on comp. agg. base.

Ⓢ Equivalent to surface in place

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS IV DRIVE

SEPTEMBER 2005

STANDARD DRAWING NO. E 610-DRIV-04

RICHARD L. VOELLER REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

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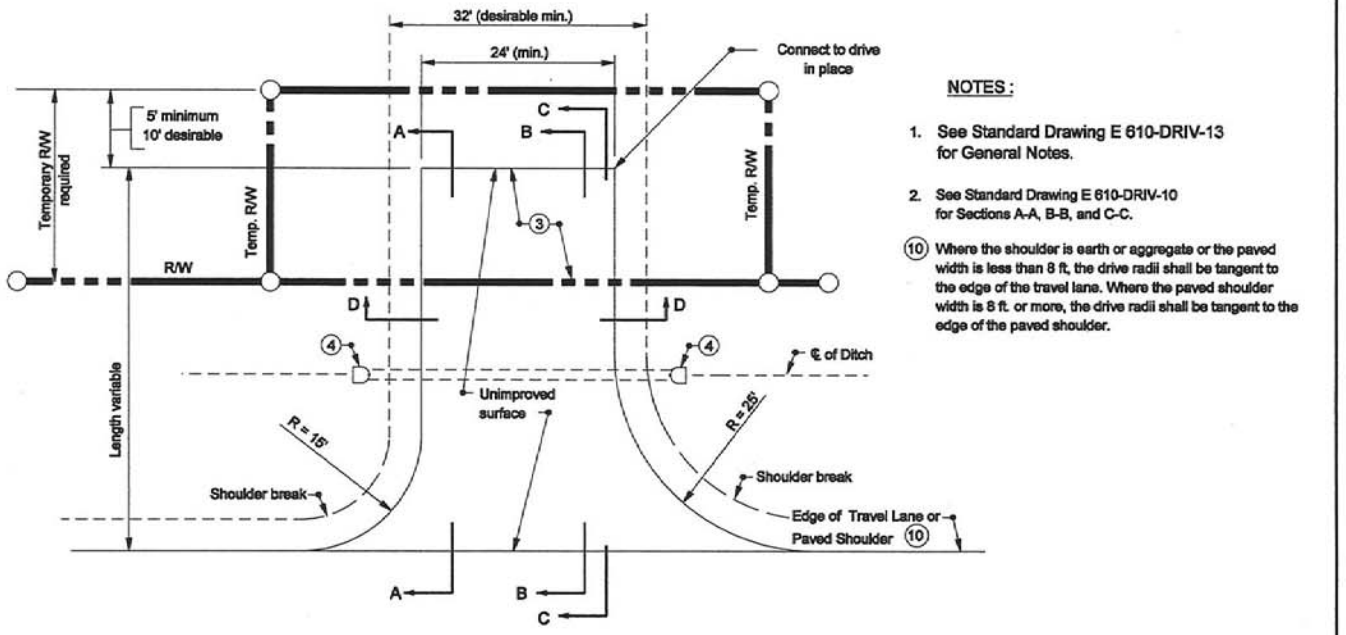
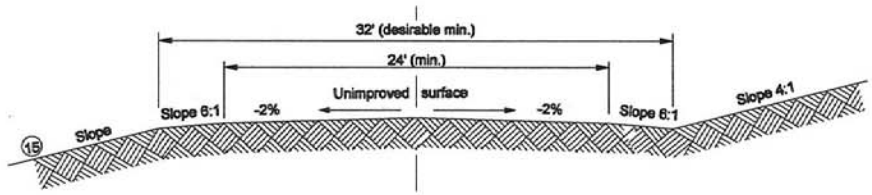


PLAN VIEW



SECTION D-D

NOTES :

1. See Standard Drawing E 610-DRIV-13 for General Notes.
2. See Standard Drawing E 610-DRIV-10 for Sections A-A, B-B, and C-C.

(10) Where the shoulder is earth or aggregate or the paved width is less than 8 ft, the drive radii shall be tangent to the edge of the travel lane. Where the paved shoulder width is 8 ft. or more, the drive radii shall be tangent to the edge of the paved shoulder.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS V DRIVE FIELD ENTRANCE

SEPTEMBER 2005

STANDARD DRAWING NO. E 610-DRIV-05

ANTHONY L. DREMOV REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

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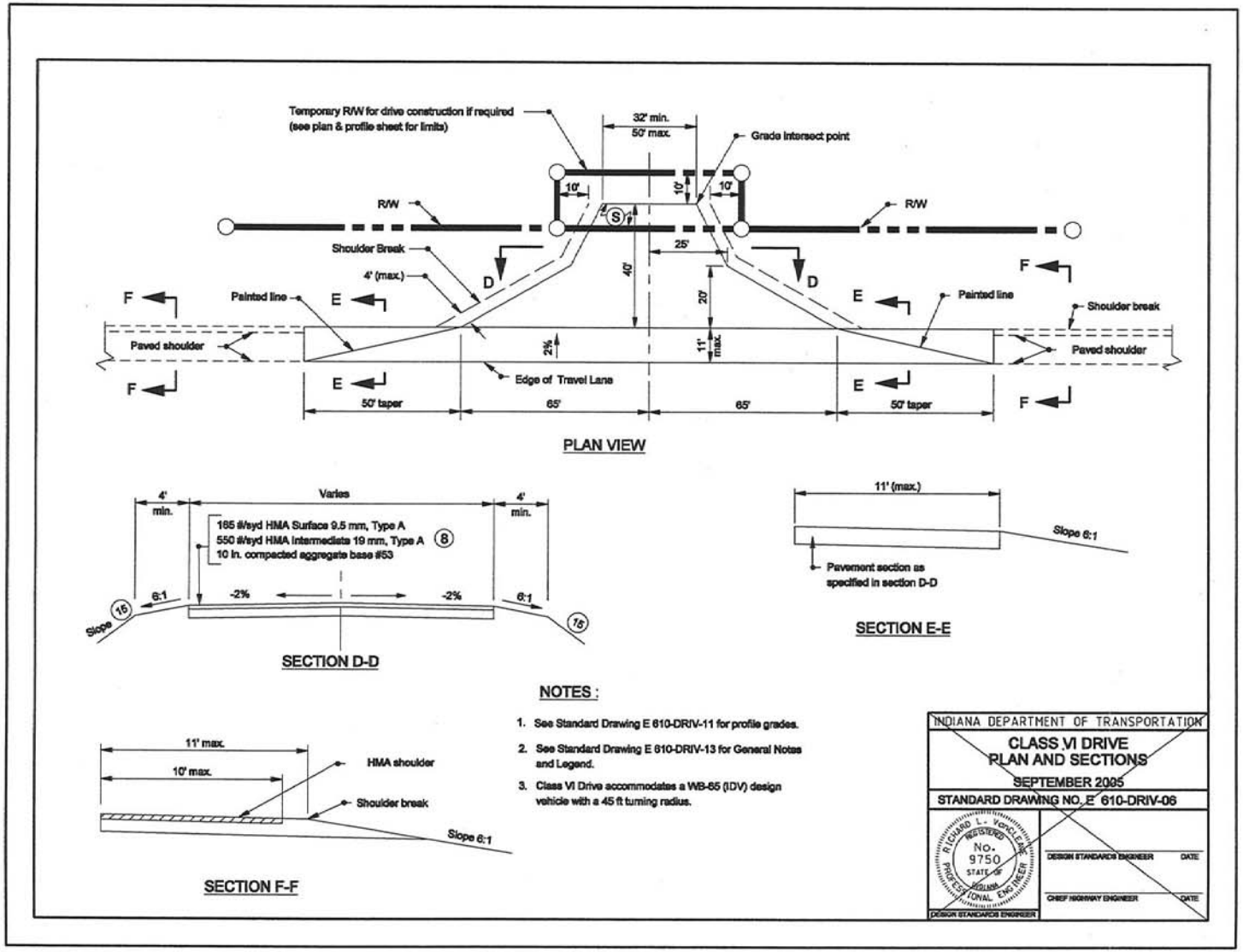

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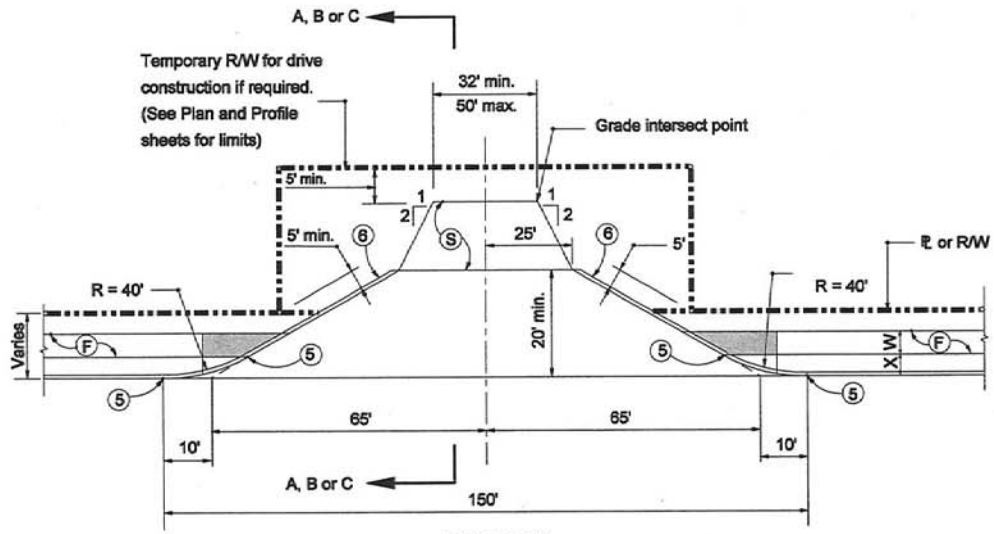
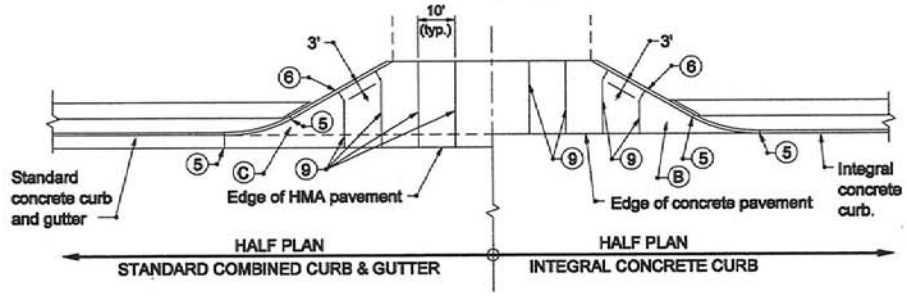


PLAN VIEW



JOINT PLACEMENT DETAIL

NOTES :

1. All Class VII drives shall be concrete to at least the Right-of-Way line with minimum length 20'.
2. See Standard Drawing E 610-DRIV-13 for General Notes and Legend.
3. See Standard Drawing E 610-DRIV-12 for sections A-A, B-B, and C-C.
4. Joint Placement Detail should be used with Class I, III and VII drives.
5. The Class VII Drive accommodates a WB-65 (IDV) design vehicle with a 45 ft. turning radius.

(B) Use ear construction Type B as on Standard Drawing E 605-ERCN-02.

(C) Use ear construction Type A as on Standard Drawing E 605-ERCN-01.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS VII DRIVE AND JOINT PLACEMENT DETAIL

SEPTEMBER 2005

STANDARD DRAWING NO. E 610-DRIV-07

RICHARD L. VANCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

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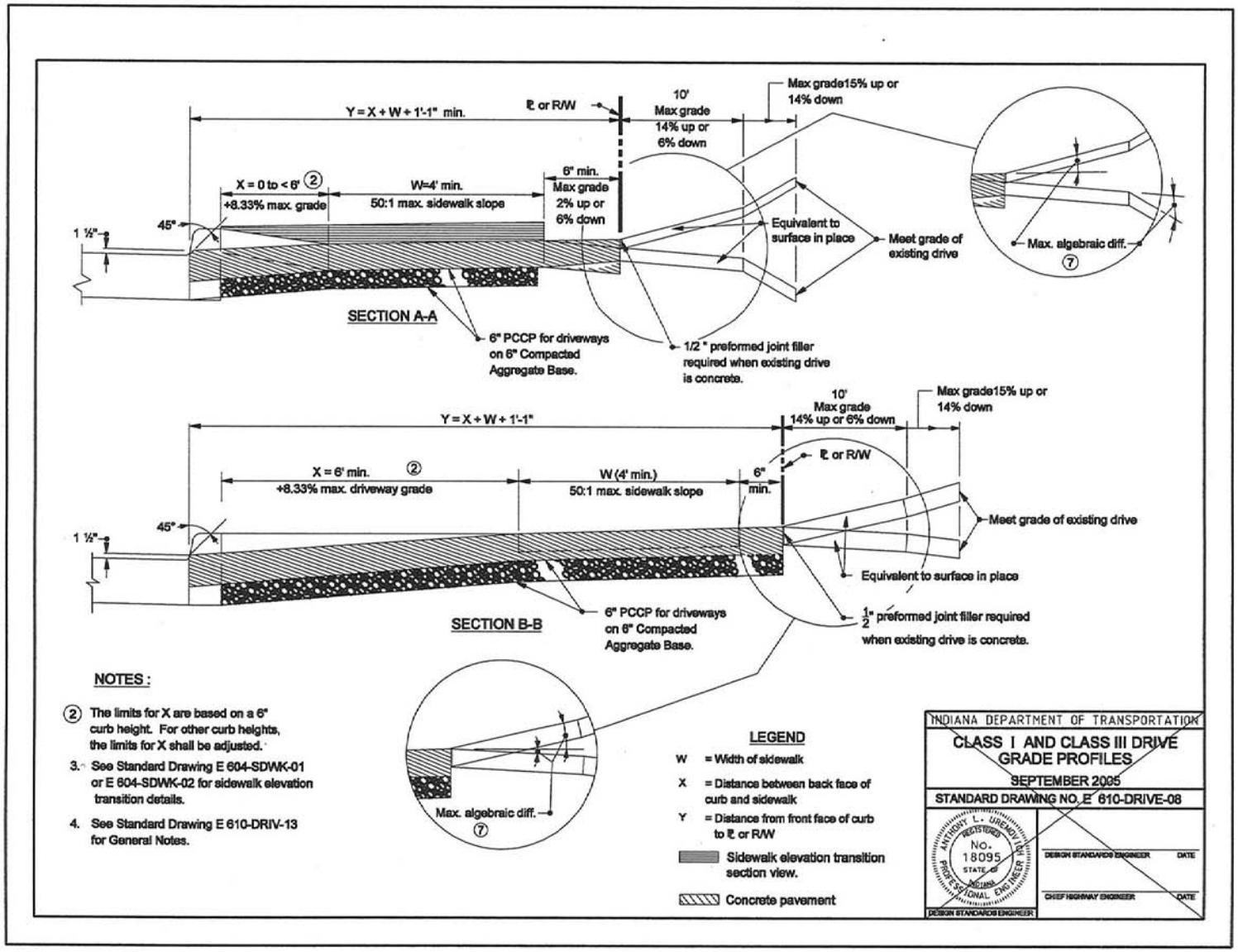

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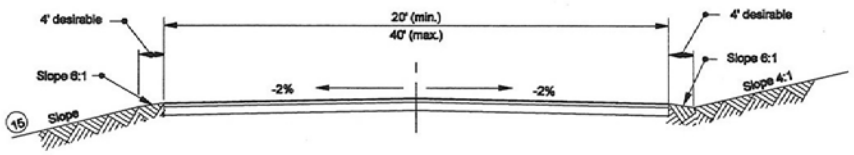
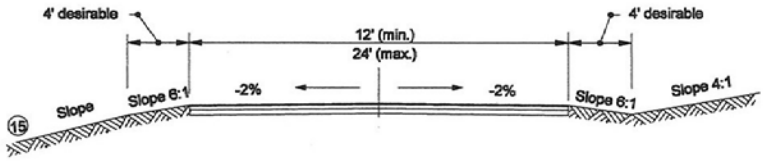


SECTION P-P - CLASS IV DRIVES



SECTION S-S - CLASS II DRIVES

NOTES:

1. See Standard Drawing E 610-DRIV-02 for Class II drive details.
2. See Standard Drawing E 610-DRIV-04 for Class IV drive details.
3. See Standard Drawing E 610-DRIV-13 for General Notes.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS II AND CLASS IV SECTIONS

SEPTEMBER 2005

STANDARD DRAWING NO. E 610-DRIV-09

RICHARD L. VOELKER REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

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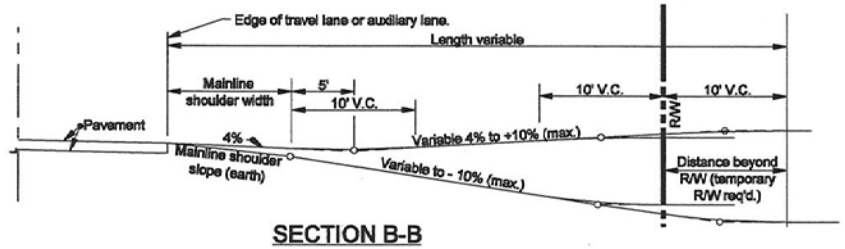
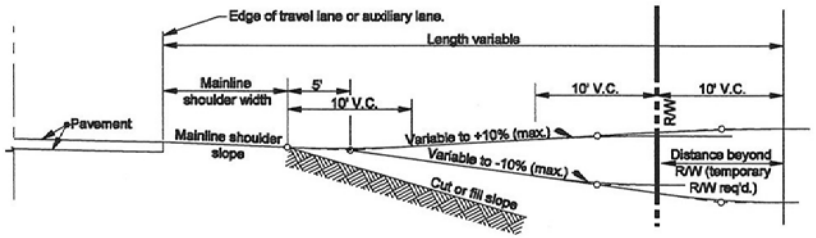


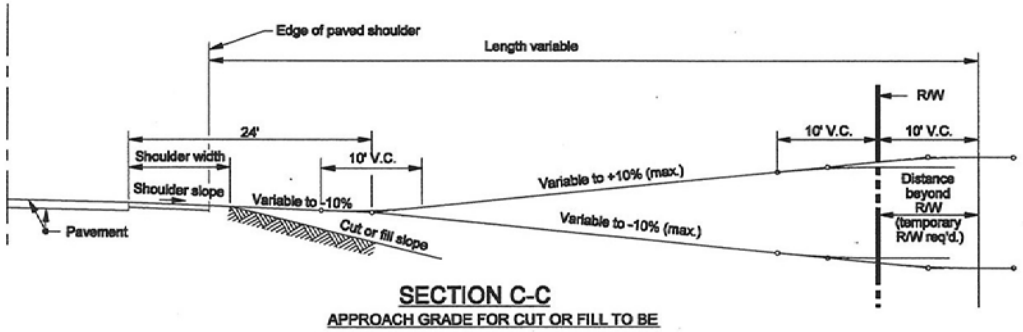
SECTION B-B

APPROACH GRADE FOR CUT OR FILL
TO BE USED WITH EARTH SHOULDERS



SECTION A-A

APPROACH GRADE FOR CUT OR FILL TO BE USED WITH
LESS THAN 8 FEET WIDE PAVED OR COMPACTED AGGREGATE SHOULDERS



SECTION C-C

APPROACH GRADE FOR CUT OR FILL TO BE
USED WITH PAVED SHOULDER 8 FEET OR WIDER

NOTES :

1. See Standard Drawings E 610-DRIV-02, -04 and -05 for location of Sections A-A, B-B and C-C.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS II, IV, & V DRIVES
APPROACH GRADES
SEPTEMBER 2005

STANDARD DRAWING NO. E 610-DRIV-10

RICHARD L. VONCILLE — REGISTERED — No. 9750 — STATE OF INDIANA — PROFESSIONAL ENGINEER
DESIGN STANDARDS ENGINEER

DESIGN STANDARDS ENGINEER — DATE

CHIEF HIGHWAY ENGINEER — DATE

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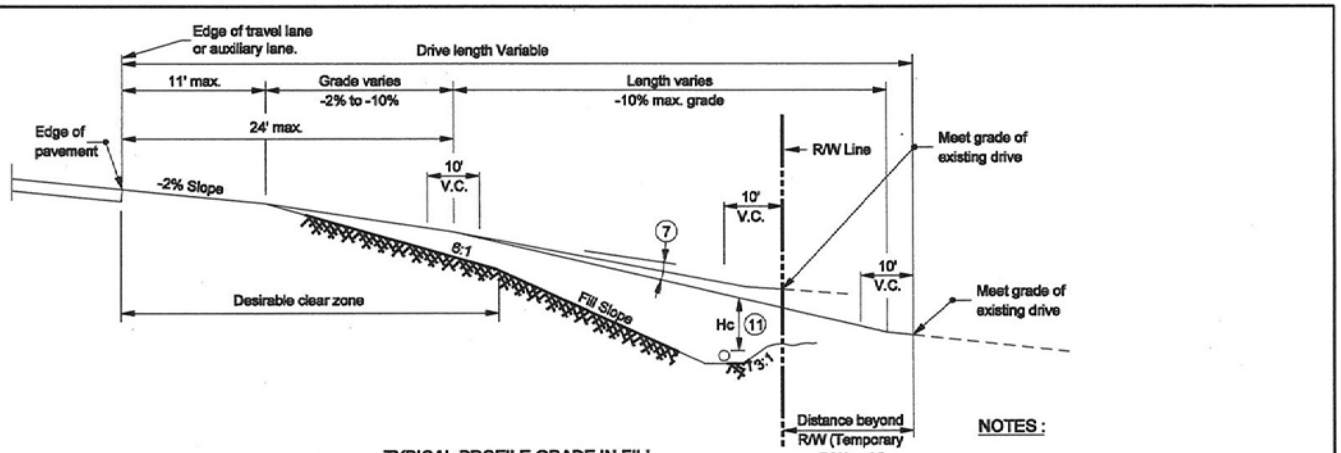
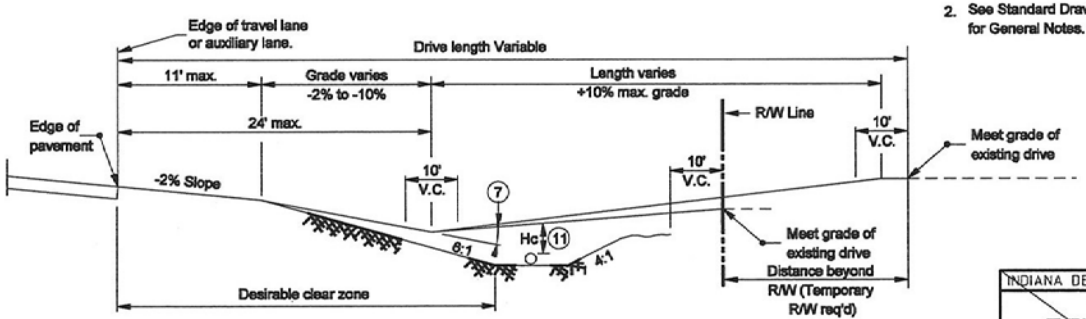


TYPICAL PROFILE GRADE IN FILL



TYPICAL PROFILE GRADE IN CUT

NOTES :

1. See Standard Drawing E 610-DRIV-06 for plan and sections of Class VI drive.
2. See Standard Drawing E 610-DRIV-13 for General Notes.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS VI DRIVE
TYPICAL PROFILE GRADES

SEPTEMBER 2005

STANDARD DRAWING NO. E 610-DRIV-11

ANTHONY L. UREMOVIC REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DESIGN STANDARDS ENGINEER DATE

CHIEF HIGHWAY ENGINEER DATE

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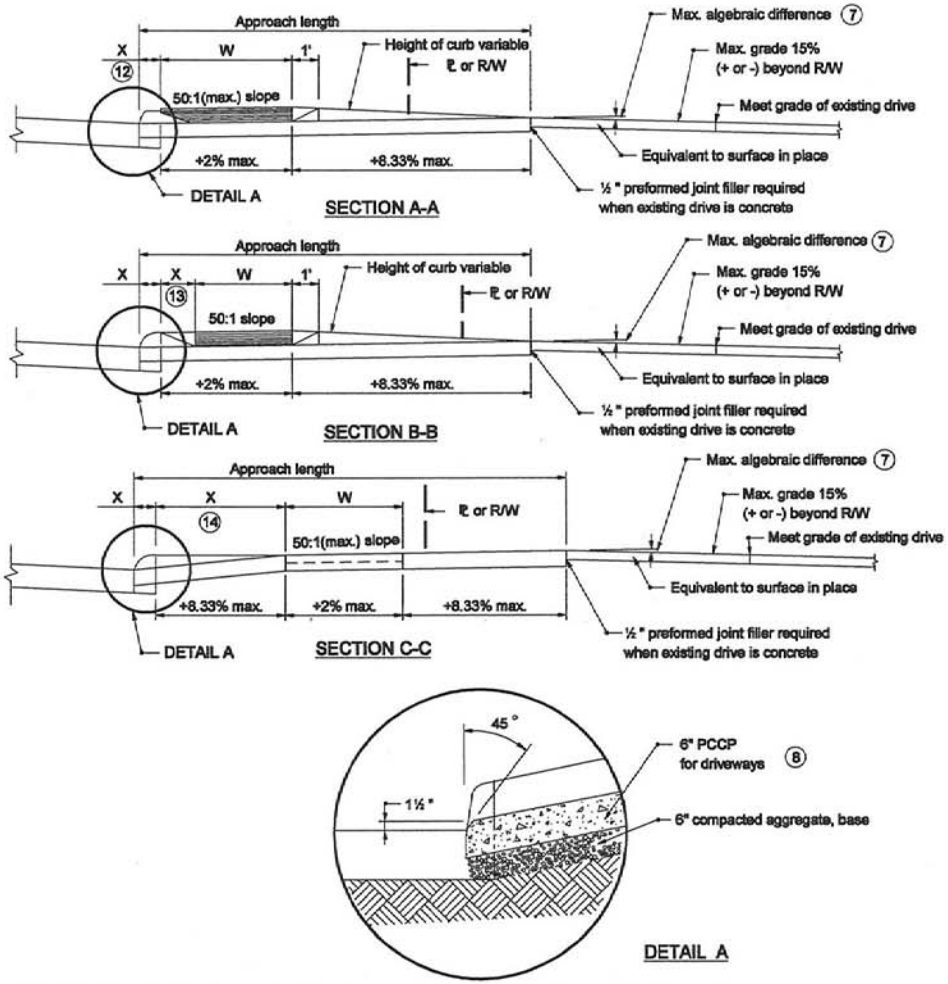

NOTES :

1. See Standard Drawing E 610-DRIV-07 for plan of Class VII drive.
2. See Standard Drawing E 610-DRIV-13 for General Notes and Legend.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS VII DRIVE
PROFILE GRADE & DETAIL A

SEPTEMBER 2005

STANDARD DRAWING NO. E 610-DRIV-12

RICHARD L. VONCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER
DESIGN STANDARDS ENGINEER

/s/ Richard L VanCleave
DESIGN STANDARDS ENGINEER — DATE

/s/ Richard K Smutzer
CHIEF HIGHWAY ENGINEER — DATE

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GENERAL NOTES :

① These notes apply to Standard Drawings E 610-DRIV-01 through 12.

2. If a concrete approach is designed for a class II or class IV drive, the radii shall be constructed using ear construction type C as detailed on Standard Drawing E 605-ERCN-02.

③ When the maximum approach grade of ±10% does not meet the grade of the existing drive before the R/W line, the approach grade of ±10% shall extend beyond the R/W to the point of intersection with the existing driveway grade. Construction beyond the R/W line shall be done in temporary R/W.

④ The appropriate pipe end treatment should be provided for pipes located either inside the clear zone or outside the clear zone.

⑦ The maximum algebraic difference in grades shall not exceed 8% for crested grade nor 12% for sagged grades.

⑧ The minimum driveway pavement sections for Class VI and Class VII Drives have been designed for 200 trucks per day. If the truck traffic count is greater than 200 per day, the required pavement section shall be as shown elsewhwere on the plans.

⑪ Hc - earth cover over culvert or pipe shall be 1 ft or greater.

⑫ Curb ramp type H, as shown on Standard Drawing E 604-SWCR-09, when the approach is signalized, or a sidewalk elevation transition as shown on Standard Drawing E 604-SDWK-02 shall be used when sidewalk is adjacent to curb.

⑬ When X is equal to or greater than 2 ft but less than 6 ft, either a curb ramp type G as shown on Standard Drawing E 604-SWCR-09, when the approach is signalized, or a sidewalk elevation transition as shown on Standard Drawing E 604-SDWK-01 shall be used.

⑭ When X is equal to or greater than 6 ft, no curb ramp or sidewalk elevation transition is required unless the curb height is in excess of 6 inches.

⑮ Driveway embankment slope within the clear zone for a road functionally classified as follows shall be:
a.) 6:1 for an arterial or a high speed (50 mph or greater design speed) collector.
b.) 4:1 for a local road or a low speed (less that 50 mph design speed) collector.

LEGEND

⑤ ½ in. preformed joint filler
⑥ Monolithic curb
⑨ Longitudinal joint
Ⓕ Concrete sidewalk
Ⓢ For type and thicknes equivalent to surface in place, see plans.

X = Distance between face of curb and sidewalk
W = Width of sidewalk
Cement Concrete Pavement for Driveways
Curb ramp, if signalized, or typically, sidewalk elevation transition.
Curb ramp or sidewalk elevation transition section view.

INDIANA DEPARTMENT OF TRANSPORTATION

DRIVES
GENERAL NOTES AND LEGEND
SEPTEMBER 2005

STANDARD DRAWING NO. E 610-DRIV-13

RICHARD L. VANCLEVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER
DESIGN STANDARDS ENGINEER

DESIGN STANDARDS ENGINEER DATE
CHIEF HIGHWAY ENGINEER DATE

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INDIANA DEPARTMENT OF TRANSPORTATION

INTER-DEPARTMENT COMMUNICATION

Standards Section – Room N642

Writer's Direct Line
232-6775

December 22, 2004 DRAFT

DESIGN MEMORANDUM No. 04-__
TECHNICAL ADVISORY

TO: All Design, Operations, District Personnel, and Consultants

FROM: _____
Anthony L. Uremovich
Design Policy Engineer
Contracts and Construction Division

SUBJECT: Drives

SUPERSEDES: *Indiana Design Manual* Section 46-11.0

EFFECTIVE: April 20, 2005, Letting

I. GENERAL INFORMATION

A. Definitions of Drives and Types

The definitions of types and classes of drives are as follows:

1. Residential. A residential drive provides access to a single family residence, duplex, or apartment building with not more than four dwelling units. A residential drive along a roadway with a raised curb is a class I drive. A residential drive along a roadway with a paved or unpaved shoulder and no raised curb is a class II drive.

2. Commercial. A commercial drive provides access to an office, retail, or institutional building, or to an apartment building with five or more dwelling units. A drive which serves an industrial plant, but with a primary function to serve an administrators' or employees' parking lot, is considered to be a commercial drive.

A commercial drive along a roadway with a raised curb is a class III drive. A commercial drive along a roadway with a paved or unpaved shoulder and no raised curb is a class IV drive.

3. Industrial. An industrial drive directly serves substantial numbers of truck movements to and from loading docks of an industrial facility, warehouse, or truck terminal. A centralized retail development, such as a community or regional shopping center, may have one or more drives especially so designed, signed, and located to provide access for trucks. This is also classified as an industrial drive. An industrial drive may be designed either as a public road approach or as an industrial drive. An industrial drive along a roadway with a raised curb is a class VII drive. An industrial drive along a roadway with a paved or unpaved shoulder and no raised curb is a class VI drive.

4. Field Entrance. A field entrance provides access to an unimproved property, e.g., a farm field with no buildings. Such a drive along a roadway with a paved or unpaved shoulder is a class V drive.

B. Drive Spacing and Corner Clearances

Closely spaced drives can cause operational problems, especially with high-volume roadways and/or high-volume drives. These problems can also result if drives are too close to at-grade intersections.

Desirably, any part of a drive, including its entrance radius, should not be placed within the radius of a public road at an intersection, including any auxiliary lanes. Preferably, there should be a 6- to 12-m (20- to 40-ft) tangent section between the drive radius and the public road radius for greater separation. If this criterion cannot be met for a property at an intersection corner, one solution may be to relocate the drive entrance from the major road to the minor road, if practical. Another possible solution is to provide a right-turn lane at the intersection. This will improve the operation of the intersection by removing the turning vehicles for the drive and intersection out of the through travel lane(s). However, significant numbers of turning vehicles may impair egress from the property.

Drives for the same owner should be located across from each other (e.g., farms) where crossing traffic is significant or where it is not desirable to permit slow or large equipment to travel along the highway or shoulder.

C. Drive Sight Distance

Indiana Design Manual Section 46-10.0 discusses intersection sight distance (ISD) criteria for intersections with public roads. Desirably, these criteria will also apply to sight distance at drives. However, for drives with low volumes, it is not warranted to explore extraordinary measures to improve sight distance. Sight obstructions, e.g., large trees, hedgerows, etc., should be checked for in the vicinity of the drive entrance which may limit sight distance. To perform the check, it is reasonable to assume an eye location of approximately 3 m (10 ft) from the edge of travel lane.

If drive sight-distance criteria with the eye location described above cannot be met, informal notification should be provided to the project reviewer for a consultant-designed project or to the supervisor for an in-house project.

D. Auxiliary Lanes

Deceleration and acceleration lanes should be considered at high-volume drive entrances, especially on a high-speed, high-volume arterial. *Indiana Design Manual* Sections 46-4.0 and 46-7.0 further discuss the design and warrants for these auxiliary lanes, which may also apply to high-volume drives. In addition to traffic-volume considerations, it may be warranted to provide a right-turn lane into the drive if the change in grade is abrupt at the drive entrance.

E. Joint Residential or Commercial Drives

If practical and agreeable to the property owners, the use of a joint drive offers one option to reduce the number of access points along the highway. The centerline of the joint drive should be located on the property line dividing the two owners. This practice will not allow either owner the opportunity to deny or restrict access to the neighbor's property and, depending on the traffic volume, may improve the traffic flow on the mainline. For a commercial drive, this may require providing a drive wide enough to handle two-way traffic.

II. DESIGN CRITERIA

The Recurring Plan Details series 604-R-485d, attached hereto, provide the Department's design criteria for the various drive classes. In addition to such series, the following should be considered.

A. Class Determination Considerations

1. If it is determined at the field inspection that a field entrance serves a barn or storage shed for farm machinery, it should be designed as a class II drive instead of a class V drive.

2. Where there are positive indications that a private residence is being used for commercial purposes, the drive should be designed as a commercial drive.

B. Radii

1. Class II and class IV drive radii should start from the edge of the paved shoulder if the width of the paved shoulder is 2.4 m (8 ft) or greater.

2. Class II and class IV drive radii should start from the edge of the traveled way if the width of the paved shoulder is less than 2.4 m (8 ft).

3. Class VI drive tapers should start from the edge of the traveled way without regard to the shoulder's width or whether or not the shoulder is paved.

C. Width

1. Drive width should be measured perpendicular to the centerline of the drive.

2. For each new drive constructed where no drive currently exists, the minimum width shown on Recurring Plan Details series 610-R-485d should be used, unless determined otherwise at the field inspection or if the Land Acquisition Division recommends a wider width.

3. The width of a reconstructed drive should be the same as the existing width but not less than the minimum width nor greater than the maximum width shown on Recurring Plan Details series 610-R-485d.

4. Each drive that serves a barn or storage shed for farm equipment should be 7.2 m (24 ft) in width.

D. Drive Grades

For a class I, III, VI, or VII drive, the maximum algebraic difference in drive grades should not exceed 8% for a crest vertical curve, or 12% for a sag vertical curve. For a class II, IV, or V drive, the maximum algebraic difference in drive grades should not exceed 11% for a crest vertical curve, or 14% for a sag vertical curve.

If it is known that large emergency vehicles or other large vehicles will be using a drive, or if the algebraic differences exceed those noted above, the fit of the drive grade should be checked against the vehicle templates.

Drive grades should be shown and drive PVIs should be identified on the cross-sections sheets.

E. Grading

The drive's embankment slope within the mainline clear zone should be as shown in Figure 04-21A, Drive Embankment Slopes.

Slope	Arterial	Collector	Local Road
6:1	All	Design Speed ≥ 80 km/h (50 mph)	n/a
4:1	n/a	Design Speed < 80 km/h (50 mph)	All

DRIVE EMBANKMENT SLOPES

Figure 04-21A

E. Paving

1. Each residential, commercial, or industrial drive should have either an asphalt or concrete surface as shown on Recurring Plan Details series 610-R-485d from the edge of the mainline pavement to at least the highway right-of-way line. The drive pavement should be replaced in kind beyond the right-of-way line.

2. A field entrance typically has an unimproved soil surface within the right-of-way.

F. Intersecting Sidewalk Treatment

1. Sidewalk curb ramps should only be used with signalized class III or class VII drives.

2. For class I drives or nonsignalized class III or class VII drives, a sidewalk elevation transition as shown on Recurring Plan Details 604-R-484d, Pages 14 and 15, attached hereto, should be used.

III. Impacts to Project with Drive Designs Complete and Right of Way Acquisition Under Way

Class I and III drives in a project to be let before September 2005 should have grades designed in accordance with the current INDOT *Standard Drawings*. However, the grades for such drives should be checked for accessibility by large emergency vehicles or other large vehicles.

Class I and III drives in a project to be let during or after September 2005 should have grades designed in accordance with the recurring plan details attached hereto. However, if the profile-grade requirements shown in the recurring plan details extend already-designed drives outside the available right of way, such drives should have their grades detailed on the plans so that the drives remain inside the available right of way. Such drives should also be checked for accessibility by large emergency vehicles or other large vehicles. Such drives should be identified as modified.

IV. Implementation

Recurring Plan Details series 610-R-485d, and also 604-R-484d, Pages 14 and 15, both attached hereto, should be called for through the August 17, 2005, letting. Beginning with the September 14, 2005, letting, the recurring plan details will be incorporated into revised INDOT *Standard Drawings*. The details will then no longer be required to be called for in specific contracts.

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Attachments

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